**Wednesday, March 19, 2025**

# Why not Choose a Better Job?*

*Flexibility, Social Norms, and Gender Gaps in Japan*

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**ABSTRACT** Japan ranks 125th out of 146 countries in the World Economic Forum's Global Gender Gap Index 2023, well below many developed countries, and has one of the largest gender pay gaps among high-income countries. On the other hand, women's labor force participation is high in Japan. However, women are much more likely to work in non-regular jobs, which are associated with lower wages and fewer hours. Men, in contrast, have regular, higher-paid jobs with long-hours requirements. In this paper, I build and estimate a model where couples jointly decide their occupations and working hours. Occupations differ in their flexibility. Regular jobs require long working hours, and hourly wages are a convex function of hours worked. Non-regular occupations have a linear mapping between hours worked and hourly wages. The model also allows for social norms that penalize women who earn more than their husbands.Given the inflexibility of regular jobs and social norms, women are more likely to choose non-regular jobs or not to work, and allocate a larger share of their hours for home production. The model can account for nearly all gaps in participation rates, occupational choices, and labor hours, along with 22.4% of the wage gap. Through the lens of the model, the inflexibility of regular jobs explains almost all the gaps in occupational choices and wages, while social norms that penalize women who earn more than their husbands account for all of the gap in the participation rate and half of the gap in hours worked.

**Keywords:** Marriage, Fertility, Bargaining, Leisure Technology
**JEL Codes:** J16, J22, J31

*I am grateful to my advisor Nezih Guner for his continued guidance and support. I thank Pedro Mira, Tom Zohar, and seminar participants at CEMFI Macro Reading Group, 47th Simpsio de la Asociación Española de Economía, and the 2023 annual meeting of the Society of Economics of the Household for their useful suggestions. I acknowledge financial support from the Maria de Maeztu Unit of Excellence CEMFI MDM-2016-0684, funded by MCIN/AEI/10.13039/501100011033, and CEMFI.

# 1 Introduction

Gender gaps in employment and wages have significantly narrowed in high-income countries over recent decades. However, one country lags behind in this global trend: *Japan*. Despite its high GDP per capita ($39,312 in 2020), Japan ranks a concerning 125th among 146 countries in the Global Gender Gap Index of the World Economic Forum 2023.

When compared to other OECD countries, two distinctive features of Japanese labor markets stand out: a high gender earnings gap and a high proportion of women working part-time. Panel (a) in Figure 1 illustrates the gender gap in median earnings of full-time employees across several high-income countries. While these gaps are gradually closing worldwide, Japan shows little convergence with international trends. The earnings gender gap in Japan remained at 21.3% in 2022, substantially higher than most high-income countries (with Korea being the only exception). Simultaneously, as shown in panel (b), the share of women in part-time employment has steadily increased in Japan, reaching 31.8% in 2022, higher than in other high-income countries. Interestingly, panel (c) reveals that Japan maintains one of the highest female employment rates among high-income countries, at 81.8% in 2022. Hence, higher female labor force participation in Japan goes together with high part-time work and significant gender gaps in earnings (Teruyama, Goto, and Lechevalier 2018).

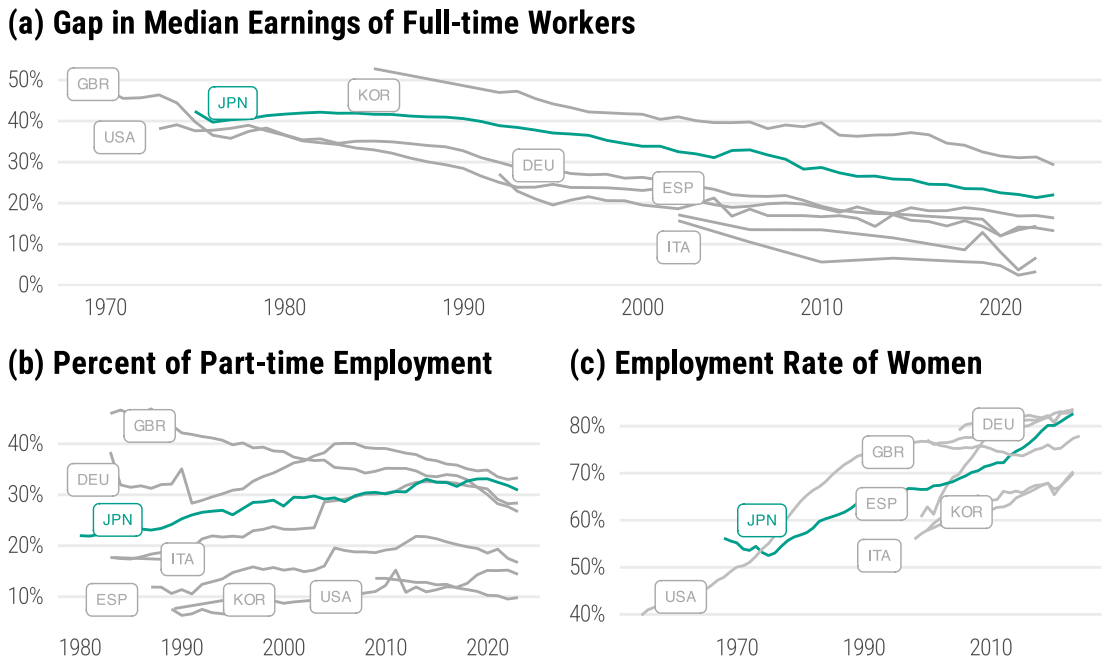



**Figure 1: Labor Market in Japan**. (a) The difference in median earnings of full-time employees where that of males is normalized as 100%. (b) Percent of part-time employment out of total employment. Part-time employment is defined as people in employment (whether employees or self-employed) who usually work less than 30 hours per week in their main job. Samples are aged from 25 to 54. (c) The employment rate is calculated by the ratio of the employed to the working-age population, from 25 to 54. Source: OECD.

These observations raise two interconnected questions: Why does Japan maintain such a large gender gap in earnings? Why is the proportion of women in part-time work so high in Japan? To address these questions, this paper proceeds through several analytical steps. First, I examine the key structural features of Japanese labor markets, with particular focus on the distinction between **regular** and **non-regular** employment, a categorization central to understanding Japan's labor dynamics. While regular workers typically hold permanent contracts and work 40 or more hours per week, non-regular workers generally have temporary contracts and work fewer than 40 hours weekly. My analysis demonstrates that non-regular jobs offer significantly more flexibility in terms of working hours, working days, and workplace location (home versus office). Importantly, women consistently cite this flexibility as their primary motivation for choosing non-regular employment.

Second, I show a significant statistical bunching just below the 50% threshold in the distribution of women's contributions to total household income. Similar to the findings of Bertrand, Kamenica, and Pan (2015), this pattern suggests the presence of social norms that penalize wives who earn more than their husbands. Supporting this interpretation, I demonstrate that women's earnings and labor supply decline sharply immediately after marriage, in stark contrast to men's outcomes, indicating the existence of what can be termed a "marriage penalty" (Kleven, Landais, and Leite-Mariante 2024). Furthermore, my comparative analysis reveals that both job inflexibility (measured as the difficulty in taking short-notice leave) and adherence to traditional social norms (measured as avoidance of situations where wives earn more than husbands) are substantially stronger in Japan than in other high-income countries.

Finally, I develop a comprehensive model of household labor supply in which couples make joint decisions about their occupations and working hours. This model serves as a quantitative laboratory to investigate the underlying mechanisms driving Japan's persistent gender gaps.

In the model, couples engage in coordinated decision-making regarding occupation and labor supply. Each partner is assigned productivity levels for both regular and non-regular employment options and chooses to work in a regular or non-regular job. They can also choose not to work. Regular jobs feature a convex wage schedule, where increased working hours yield progressively larger wage increases, a structure that rewards longer hours. In contrast, non-regular jobs maintain a linear relationship between hours worked and compensation. The model allocates couples' time across three domains: market work, home production, and joint leisure. Each couple must fulfill a specific home hours requirement, which varies across households to reflect different domestic circumstances, such as childcare responsibilities. Critically, the model incorporates a utility cost when a wife's earnings exceed her husband's, capturing the influence of prevailing social norms.

Within this model economy, some couples draw high productivity levels for regular employment, potentially leading both partners to select regular jobs. However, this outcome depends on the utility costs associated with situations where wives earn more than their husbands. In other households, patterns emerge where husbands work in regular jobs while wives take non-regular positions or exit the labor market entirely. The model's parameters are calibrated to match

observed correlations between husbands' and wives' wages and working hours, as well as key moments from the joint earnings distribution of couples.

After calibration, I evaluate the model's performance by comparing its predictions against empirical gender gaps, outcomes that were deliberately *not targeted* during the calibration process. The baseline model successfully explains a substantial proportion of observed gender disparities: nearly all gaps in participation rates, occupational choices, and labor hours, along with 22.4% of the wage gap. Additionally, the model accurately reproduces both the joint distribution of couples' occupational choices (across regular, non-regular, and non-working categories) and the joint distribution of working hours conditional on these occupational selections.

What roles do job inflexibility and social norms play in perpetuating these gender gaps? Through the analytical lens of the model, I find that the inflexibility inherent in regular employment explains nearly all observed gaps in wages and significant proportions in participation and occupations. Meanwhile, social norms that penalize women earning more than their husbands account for all the gender gaps, as the model does not include any other inherent asymmetries between men and women.

Finally, I conduct a counterfactual simulation examining the potential impact of outsourcing housework. Japanese couples rarely utilize external housework services and consequently devote substantial time to domestic tasks, particularly when raising young children. One contributing factor to this pattern is Japan's highly restricted international migration, which limits the availability of household labor.[2] I interpret the benchmark economy as representing a situation where housework services are prohibitively expensive and therefore unused. By allowing households to purchase these services at the median wage rate of non-regular workers from the benchmark economy, the simulation reveals that access to affordable housework services would eliminate more than 50% of existing gaps in labor force participation, occupational choices, working hours, and wages.

**Related Literature** This paper contributes to the growing body of labor and macroeconomic literature examining the relationship between household responsibilities and gender gaps in the labor market.[3] Goldin and Katz (2011) and Goldin (2014) identify that certain occupations feature convex (non-linear) wage schedules while others maintain linear relationships between hours and compensation. This distinction aligns with empirical evidence showing that part-time workers typically earn less per hour than their full-time counterparts (Aaronson and French 2004; Ameriks et al. 2020). Building on these insights, Erosa et al. (2022) models couples' occupational decisions across jobs with varying degrees of flexibility. While their framework effectively captures heterogeneous job flexibility through a streamlined approach, it treats the allocation of home hours as exogenous, assuming women inherently dedicate more time to household tasks than men. In contrast, my model endogenously generates these differences through its home production component. Another relevant contribution comes from Cubas, Juhn, and Silos (2019), which models the concentration of working schedules by incorporating penalties for absence during peak hours.

[2]Several studies examine the impact of low-skilled migration on women's labor supply, including Cortés and Tessada (2011), Barone and Mocetti (2011), and Farré, González, and Ortega (2011).

[3]For a comprehensive recent review, see Albanesi, Olivetti, and Petrongolo (2023).

They argue that women with children face disproportionate penalties due to their greater household responsibilities. While their approach models job flexibility using detailed time-use data, my framework conceptualizes flexibility through the convexity of wage schedules.

The research most closely aligned with my approach is Calvo, Lindenlaub, and Reynoso (2024), which models assortative mating across labor and marriage markets. They demonstrate how complementarity in spouses' home hours creates positive sorting patterns in both marriage and labor markets, subsequently influencing labor supply decisions. While complementarity in home production similarly plays a crucial role in my model, my distinct focus on social norms and job flexibility differentiates this paper from existing literature.

My second contribution lies in explicitly incorporating social norms into couples' occupational choice frameworks. Similar to the patterns Bertrand, Kamenica, and Pan (2015) identified in the United States, Japanese data reveals a pronounced discontinuity in the distribution of wives' earnings relative to their husbands'. By integrating these gender-based expectations regarding working hours and income into the model, I provide a compelling explanation for the substantial gender disparities in occupational choices observed in Japan.

Finally, this paper significantly advances our economic understanding of gender gaps in Japan. Despite having one of the largest gender disparities among developed nations, the underlying drivers of Japan's gender inequality have received limited attention in economic literature. Onozuka (2016) examines the partial convergence in Japan's gender wage gap from 1992 to 2002, arguing that women were systematically displaced from regular to non-regular employment during this period. Teruyama, Goto, and Lechevalier (2018) identifies increased female labor supply as a primary factor in the growth of non-regular employment in Japan during the 2000s. Additionally, Kitao and Mikoshiba (2022) provides quantitative analysis of how fiscal policies influence female labor force participation and occupational choices. While these studies offer partial explanations for gender disparities in occupation and wages, few have comprehensively disentangled the structural causes of Japan's gender gaps, and most notably, they have not adequately addressed the role of social norms. To my knowledge, this research represents the first comprehensive analysis that simultaneously explains Japan's gender gaps across four critical dimensions: labor force participation, occupational selection, working hours, and wages.

The remainder of this paper is structured as follows: In the next section, I document key empirical facts about gender gaps in Japan. In Section 3, I develop the baseline model that captures couples' joint decisions on occupational choices and working hours while incorporating social norms. Section 4 outlines the calibration methodology. Section 5 presents results for untargeted moments, while Section 6 analyzes the four dimensions of gender gap measurements. In Section 7 and Section 8, I explore the mechanisms driving gender gaps and investigate the specific role of social norms. Section 9 summarizes the findings and discusses their implications.

## 2 Stylized Facts

This paper relies on two main data sources: the Japanese Panel Study of Employment Dynamics (JPSED) and the Survey on Dual-Income Couples' Household Economy and Attitudes 2014 (S-

DICHEA).[4] JPSED is panel data since 2016, with the most recent data wave from 2020.[5] The sample is 57,284 individuals older than 15. This survey has information on earnings, working hours, and types of jobs. For married individuals, it also contains information on the spouse's job and earnings. The SDICHEA contains data for 2200 two-earner couples in the Greater Tokyo Area, aged from 35 to 49 for females and 30 to 55 for males. The SDICHEA was a one-time survey in 2014 and has information on earnings, working hours, housework, and types of jobs for couples.

## 2.1 Regular and Non-Regular Workers

In the context of Japanese statistics, the terms **regular** and **non-regular** jobs are widely used to categorize employment types. Since it is based on the job categorization of each company, there are no legal or precise definitions.[6] However, they are typically described as follows: A regular worker usually has a permanent contract, works 40 hours or more at a higher wage, while a non-regular worker has a temporary contract and works less than 40 hours at a lower wage.

Panel (a) in Figure 2 shows that 35.8% (44.8%) of male (female) regular workers work exactly 40 hours per week and 52.5% (33.3%) works more than that. On the other hand, only 24.0% (6.1%) of non-regular male (female) workers work more than 40 hours. In addition, panel (b) shows that these two occupations differ in hourly wages. While 47.6% (60.9%) of non-regular male (female) workers work with a wage less than 1000 JPY[7], only 7.1% (17.8%) of regular workers do. Note that using the OECD definition of "less than 30 hours per week in their main job," 30.6% (61.0%) of male (female) non-regular workers would be categorized as being in part-time employment.

[4] I discuss the detail of data sets in Section A.

[5] Data was distributed one year later. The data in 2019 was distributed in 2020 and called JPSED2020.

[6] See Asao (2011) for a more detailed discussion on the definition of regular and non-regular jobs.

[7] 1000 JPY $\simeq$ 6.21 EUR.

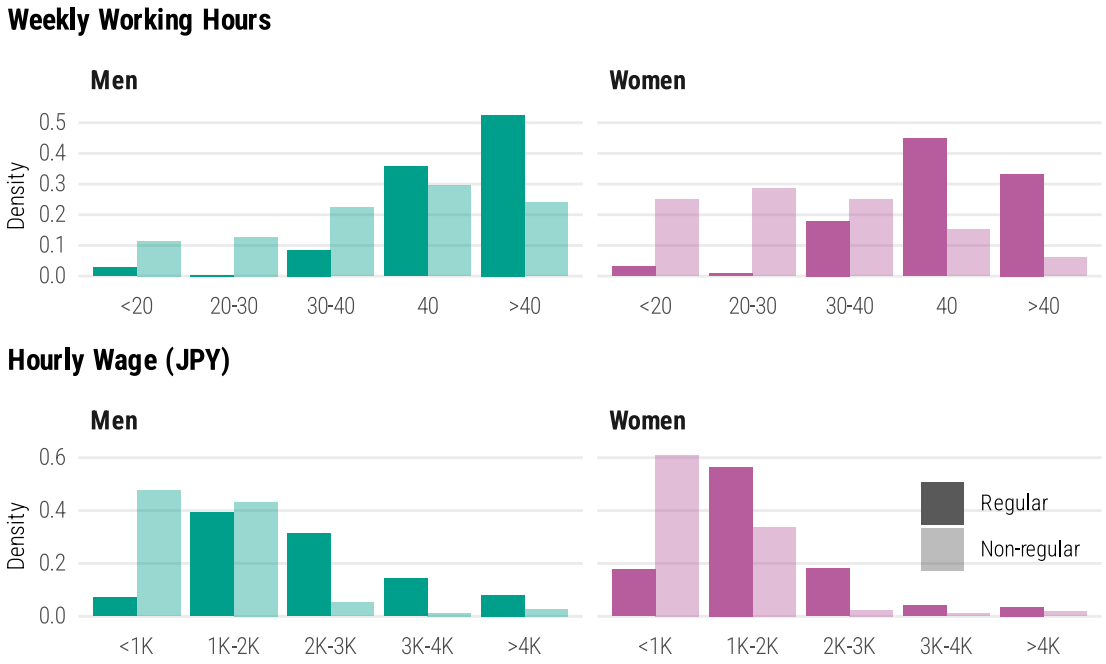



**Figure 2: Distribution of Weekly Working Hours and Hourly Wage**. The data is pooled data of JPSED2016-2020. The sample includes men and women aged between 25 and 59.

The gender gap in occupational choices is shown in Figure 3 . We can see clear gender differences in occupational choices in married individuals. While almost 90% of men work as regular workers, less than 30% of women work as regular workers, and the share decreases by age. In addition, the proportion of non-regular workers is much higher in female employees; almost half of the female employees choose non-regular jobs.

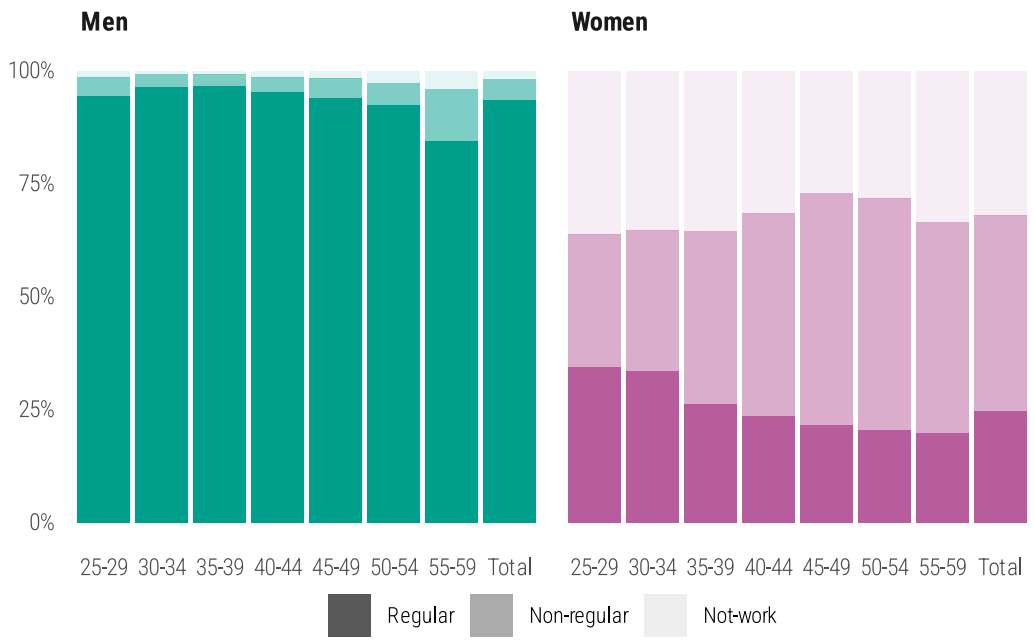



**Figure 3: Occupational Choice of Married Individuals**. The data is pooled data of JPSED2016-2020. The sample includes married men and women aged between 25 and 59.

## 2.2 Non-linear Wage Schedules and Job Flexibility

Why do women choose non-regular jobs? To answer the question, I map regular and non-regular jobs into non-linear and linear jobs in Goldin (2014), who emphasizes that some jobs have a highly non-linear (convex) pay structure with respect to working hours, while others have one almost perfectly linear. Given a non-linear wage schedule, a worker can work at a high wage in exchange for long working hours. On the other hand, a linear job worker can flexibly decide their working hours since there is no penalty in wages for reducing working hours. Hence, there is a trade-off between job flexibility and wage.

To highlight the difference between regular and non-regular jobs, I start the analysis with a regression similar to Bick, Blandin, and Rogerson (2022):

$$y_{it} = a_i + \lambda_t + \left( \sum_{h \in H, h \neq 40} \beta_h \mathbb{1}_{ith} \right) + \gamma X_{it} + \varepsilon_{it}, \tag{1}$$

where $y_{it}$ represents the yearly earnings of individual $i$ at time $t$ and $X_{it}$ is his/her characteristics (age, square of age, industry). I denote $H = \{20, 25, ..., 60\}$ as 5-hour bins for weekly working hours, and $\mathbb{1}_{ith}$ is an indicator if $i$'s working hours in the bin $h \in H$ at time $t$. As a result, the coefficient $\beta_h$ represents the relative earnings to one of 40 hours with various human-capital-related parameters controlled. In Figure 4 , I plot the coefficient of the regression of (1) .

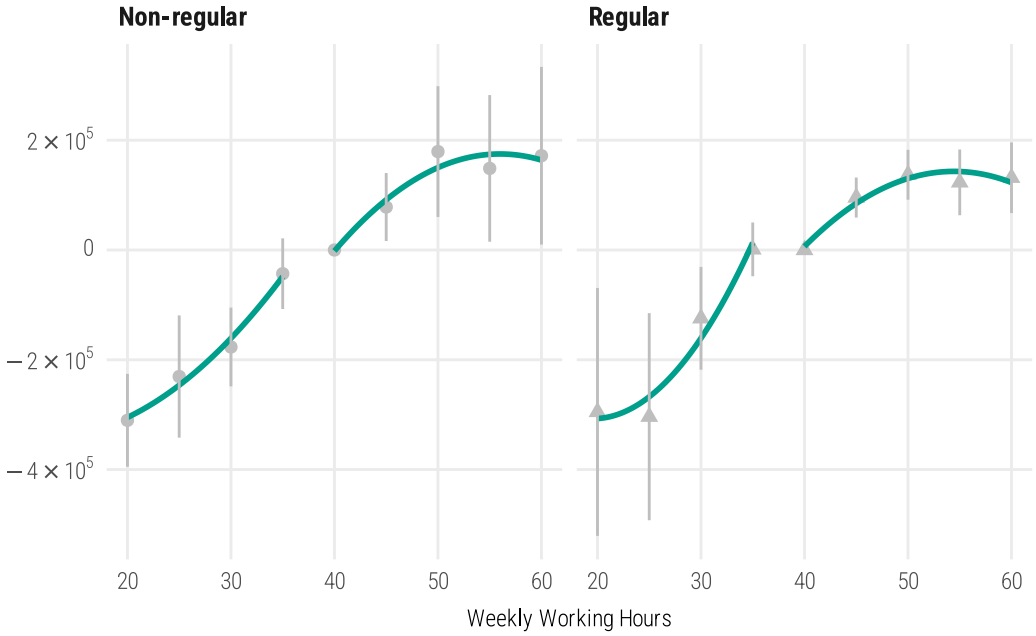



**Figure 4: Working Hours and Earnings**. The data is panel data of JPSED2016-2020. The sample includes men and women aged between 25 and 59. Each dot and line is the coefficient and 95% confidence interval of (1) . The blue line is a quadratic function fitting to the dots.

Consistent with Goldin (2014) and others, there is a convex shape for regular workers and a linear one for non-regular workers for working hours below 40. The convex wage schedule below 40 hours is a penalty for working less than 40 hours, which explains why the working hours of regular workers are concentrated at exactly 40 hours and more.

Figure 5 represents a direct measurement of the flexibility of regular and non-regular jobs, based on survey data. The questions asked regular and non-regular workers about the flexibility of their jobs with a 5-scale measurement: 5 is the highest and 1 is the lowest. Each point shows the mean of the job flexibility in terms of working days, working hours, and working place. We can see that the regular worker has less flexibility in all aspects. Also, female non-regular workers have more flexibility than male regular workers, while female regular workers have the same inflexibility as male regular workers.


**Figure 5: Flexibility of Regular and Non-regular Jobs**. Pooled data of JPSED2016-2020. The sample includes men and women aged between 25 and 59. Each statistic is the mean of a 5-scale measurement about their jobs, 5 is the highest and 1 is the lowest.

Finally, if regular jobs require 40 hours of commitment and women have to allocate a large amount of time to housework, they may choose non-regular jobs, which are more flexible. Actually, Figure 6 supports this argument. This figure shows the reasons why married women in the non-regular workforce chose their current job. More than 60% of the women chose "job flexibility" as the reason and nearly 40% chose "housework". We can also see "cannot get regular jobs" is not the main reason (less than 10%) why they chose non-regular jobs.

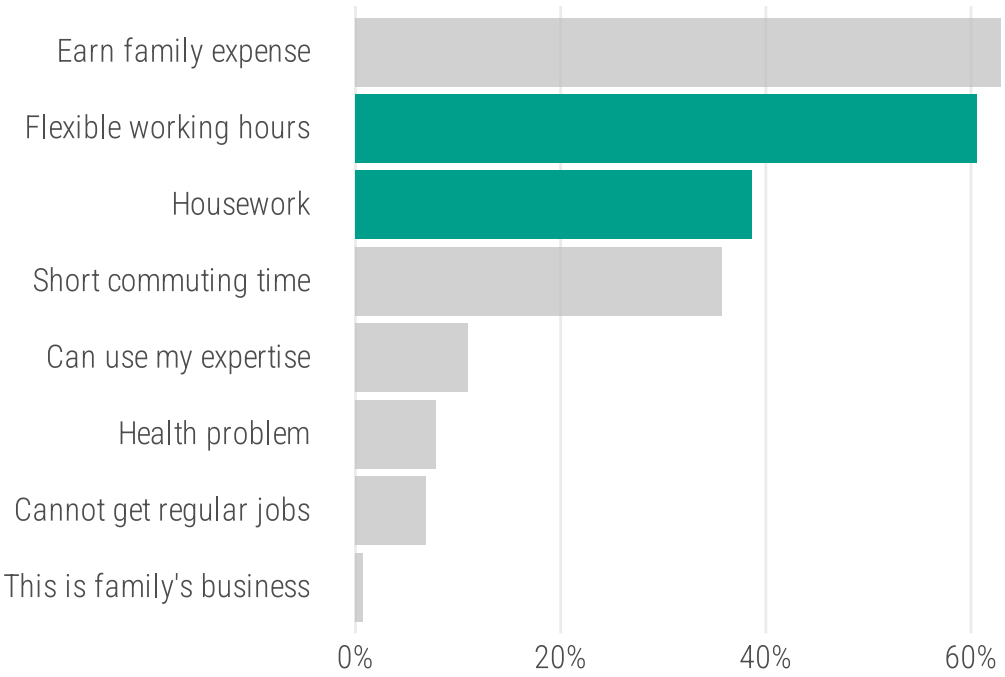



**Figure 6: Reasons Why Women Choose Non-regular Work**. The data is pooled data of JPSED2016-2020. The sample includes married women aged between 25 and 59 who have non-regular jobs. They could choose all the reasons why they chose non-regular jobs.

## 2.3 Social Norms and Marriage Penalty

Bertrand, Kamenica, and Pan (2015) show that there is a sharp drop in the distribution of household income share at the line that wives earn more than their husbands. This type of gender role plays similarly in Japan. Figure 7 shows the distribution of the earning share of wives. We can see a clear gap between below 50% and above 50%, which suggests discontinuous behavior at the point where a wife earns more than her husband.[8] In addition, the rising pattern just before 50% supports the strength of this social norm.

[8]Following Kuehnle, Oberfichtner, and Ostermann (2021), I conduct robustness check with smaller bins and a non-parametric method. The results, which are similar, are in Section B.1.

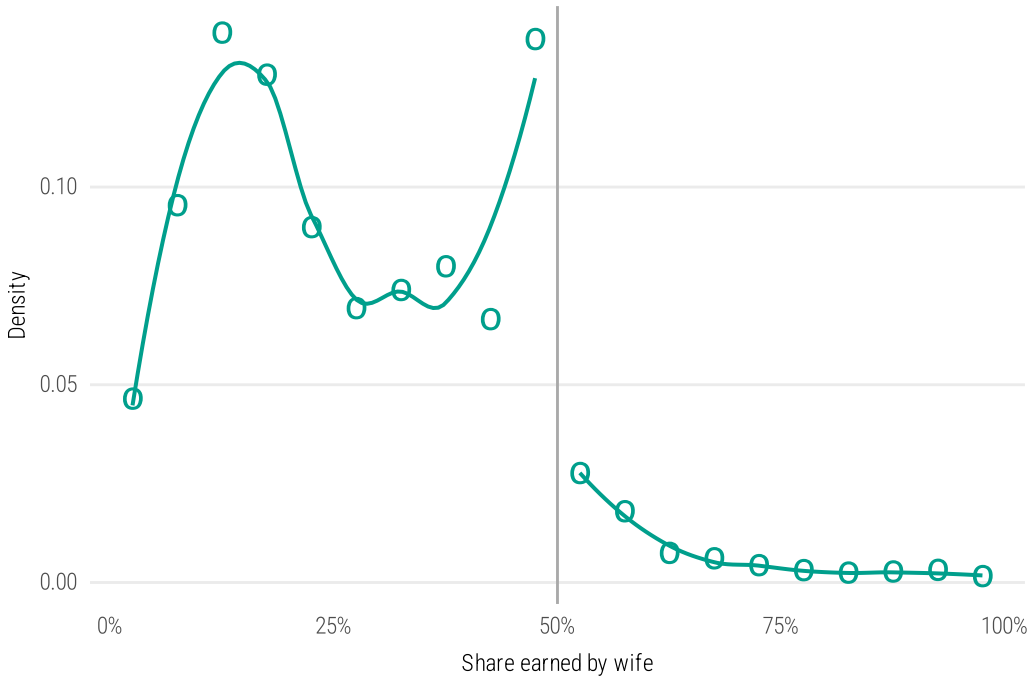



**Figure 7: Distribution of Relative Earnings**. The data is pooled data of JPSED2016-2020. The sample includes married couples of which participants of the survey are between 25 and 59 years old. Couples, where only one of them is working, are excluded. Each dot is the fraction of couples in a 0.05 relative earnings bin. The vertical line shows the relative earnings share is 0.5. The dashed line is the lowess smoother applied to the distribution allowing for a break at 0.5.

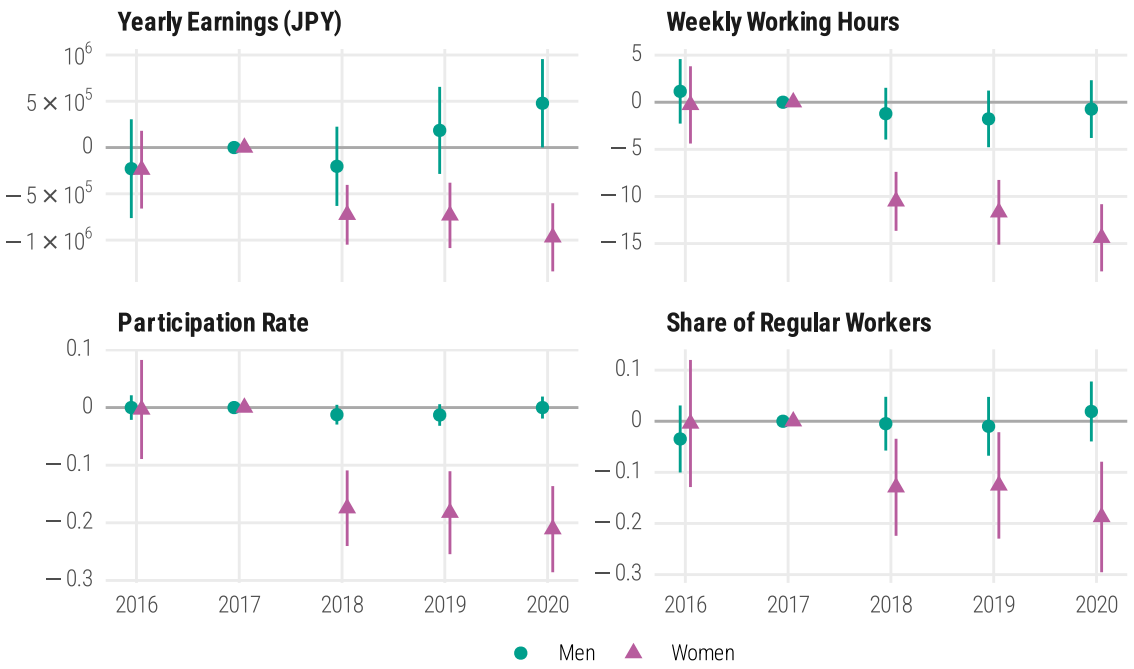



**Figure 8: Impact of Marriage on Labor Outcomes**. The data is pooled data of JPSED2016-2020. The sample includes individuals who got married in 2018. Each point represents the gap from the variable in 2017, one year before the marriage. The error bars show the 95% confidence interval.

If there is a penalty for higher wives' earnings, which reflects social norms, women, upon marriage, will be more likely to choose shorter working hours, non-regular jobs, or exit from the labor market. In Figure 8 , I show the event study of labor market outcomes for women who got married in 2018. My approach follows the recent literature that studies the impact of children on gender gaps, e.g., Kleven, Landais, and Søgaard (2019), but focuses on marriage rather than the childbearing event.[9]

I focus on yearly earnings, weekly hours worked, participation, and the fraction of workers in regular jobs and report all outcomes relative to 2017, the year before marriage. Upon marriage, there is a sharp decline in all outcomes. Once married, women's participation declines by 17.5% points, and the fraction of them who work in a regular job also experiences a decline. The resulting drop in yearly earnings is about −726 thousands JPY. In contrast, participation, hours worked, and the share with regular jobs do not change for husbands, while their earnings increase substantially.

[9]For a set of European countries, Berniell et al. (2022) estimate the separate effects of marriage and childbearing on women's labor market outcomes, and find a relatively small role for marriage. Kleven, Landais, and Leite-Mariante (2024) compute the marriage and child penalty on employment rate for Brazil, China, Japan, Mauritius, Rwanda, Sweden, the United Kingdom, and Zambia. Herold and Wallossek (2023) calculates marriage earning gaps with German administrative data.

## 2.4 Comparison of Job Inflexibility and Social Norms with Other Countries

In this section, I compare Japan with other countries in terms of job flexibility and social norms. As I show in Section 7, job inflexibility and social norms play a central role in explaining the gender gap in Japan. While these factors are not unique to Japan, I show that job inflexibility and social norms are larger than those in other countries, and suggest that these two factors could be the main cause of Japan's lagging behind other countries in closing the gender gap.

Since there is no survey asking the same question about job inflexibility in Japan and other countries, as a proxy measurement, I use a question in JPSED and the Labor Force Survey of Eurostat. In the JPSED, respondents are asked to rate their agreement with the statement "I was able to choose my working days" on a scale of 1 to 5. Eurostat has a question of "Persons in employment by level of difficulty to take one or two hours off at short notice", the respondents answer on a 1-4 scale. To match the JPSED sample to Eurostat, I use men and women employed, aged between 35 and 49, and having children, and rescale the level of difficulty to the 1-4 scale. Although this is not a direct comparison between Japan and other countries, Figure 9 indicates that regular workers in Japan might have more difficulty taking a day off.

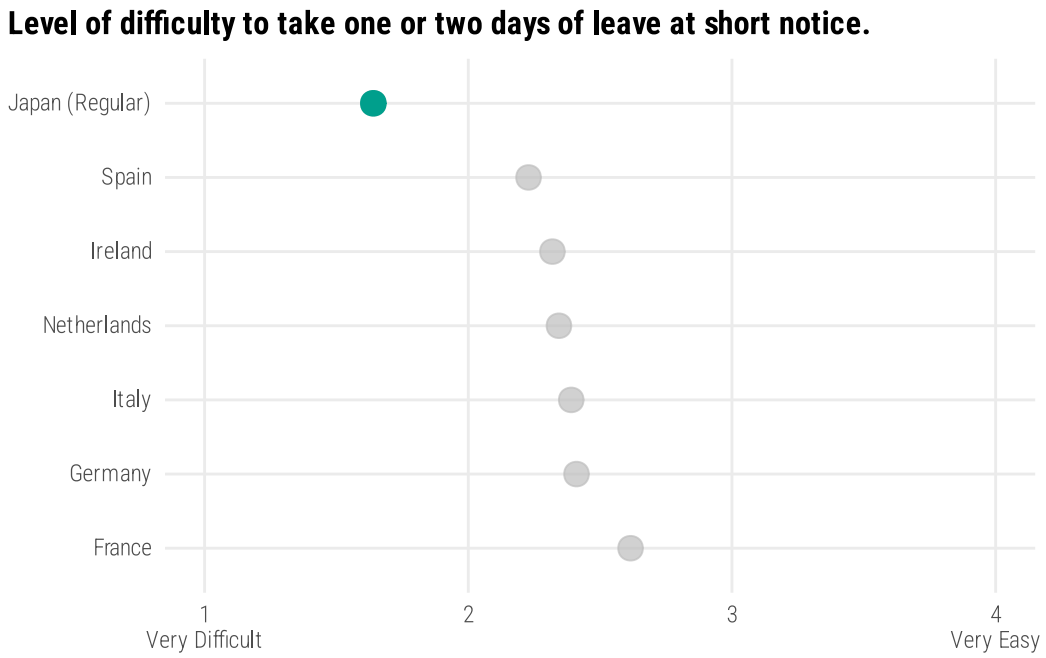



**Figure 9: Flexibility of Working Days**. Sample includes men and women employed, aged between 35 and 49, and having children. Data from the Eurostat Labor Force Survey in 2019 for European countries and JPSED for Japan. I use only regular workers for Japan.

In World Value Surveys, there is a question asking, "If a woman earns more money than her husband, it's almost certain to cause problems." The respondents answer on a 1-5 scale; 1 is "strongly agree" and 5 is "disagree strongly". Figure 10 plots the mean of the score by country. Among these high-income countries, Japan has the strongest social norms.

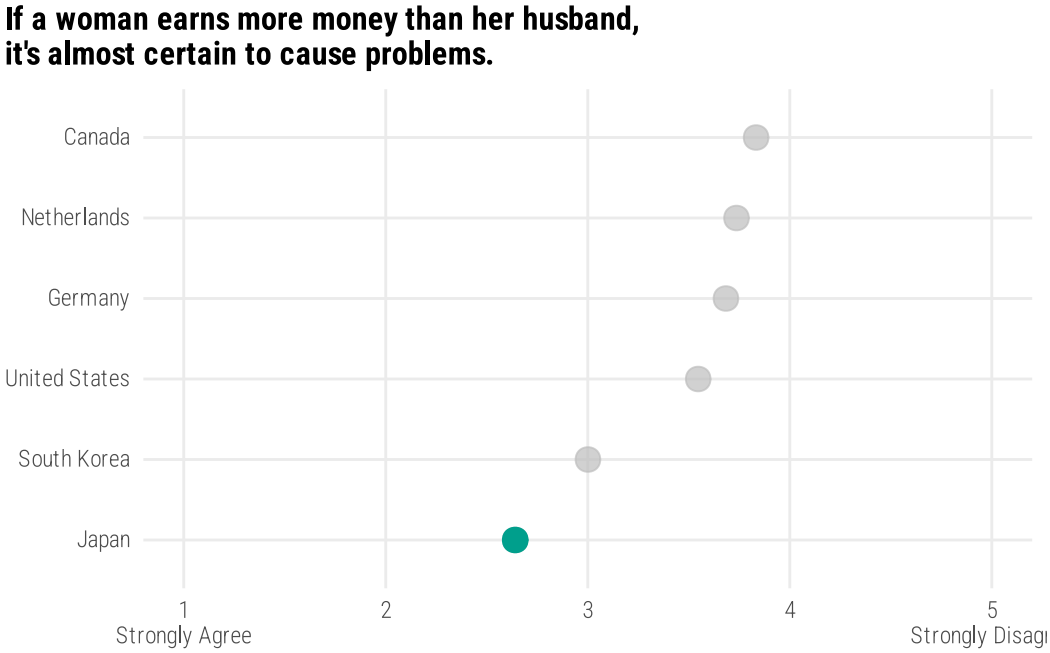



**Figure 10: Social Norms on Wives' Earnings**. Each data point is the mean of the answer by country. Source: World Value Survey Wave 7 (2017-2022).

# 3 Model

The model economy is populated by married couples that consist of a male and a female, denoted by $g \in \{m, f\}$. A couple decides whether each member should work or not, and if they do, which occupations to choose. The occupations can be regular, $R$, or non-regular, $NR$. Not working is denoted by $NW$. If an individual works, they also decide on their market hours, $h_m$ and $h_f$. Each individual is endowed with one unit of time and a requirement of joint home hours $D$. This requirement differs across households, and each household decides their home hours $d_m$ and $d_f$, satisfying $D = d_m + d_f$. The remaining hours, $1 - h_m - d_m$ and $1 - h_f - d_f$, are allocated to joint household leisure. Each individual is endowed with a productivity (ability) level for the regular and non-regular job, denoted by $a_{g,R}$ and $a_{g,NR}$. These ability levels are drawn from a joint distribution for the couple.

**Utility Function** The couples maximize their joint utility:

$$\max_{h_m,h_f,d_m,d_f,j_m,j_f} U = \ln c + \gamma \ln H\Big(1 - h_m - d_m, 1 - h_f - d_f\Big) - \delta \mathbb{1}\Big\{e_f > e_m\Big\},$$

subject to

$$c = e_m\big(h_m, a_{m,j}, j_m\big) + e_f\Big(h_f, a_{f,j}, j_f\Big),$$

where $c$ is a consumption, and $\gamma$ is a preference parameter for the joint leisure of the couple, denoted by a function $H(\cdot)$. The index $j_g \in \{R, NR, NW\}$ denotes the occupational choices. The

consumption is constrained by the couple's joint earnings $e_m$ and $e_f$, which depend on the type of occupation, productivity, and hours worked.

If the wife earns more than the husband, i.e., $e_f > e_m$, the couple incurs a utility cost $\delta$. Couples are heterogeneous in $\delta$. In particular, each couple draws $\delta$ from a cumulative distribution $F_\delta$. This heterogeneity captures differences in social norms across couples.

**Productivity** I also assume that the set of productivities $\left(a_{m,R}, a_{f,R}, a_{m,NR}, a_{f,NR}\right)$ is different across couples. In particular, $\left(a_{m,R}, a_{f,R}, a_{m,NR}, a_{f,NR}\right)$ is drawn from a log-normal distribution.

**Convex wage schedules** Following Goldin (2014) and Erosa, Fuster, Kambourov, and Rogerson (2022), regular and non-regular jobs in the model differ in how hours worked, $h_m$, map into effective labor input that determines earnings. For regular jobs, effective labor input is a convex function of hours worked, i.e., the longer an individual works, the higher her effective labor input. This creates incentives to work longer hours since there is an implicit penalty for working short hours. In contrast, the relation between hours worked and effective labor input is linear for non-regular jobs. As a result, if one of the partners cannot supply long hours, they have an incentive to select a non-regular occupation.

Figure 2 shows that 35.8% (44.8%) of regular male (female) workers work exactly 40 hours per week and that 52.5% (33.3%) works more than that. This suggests that 40 hours of work per week is a standard requirement for regular workers and makes it difficult for women to work as regular workers.

To capture these two features, i.e., linear vs. non-linear jobs and a concentration of 40 hours per week, I assume that the production function for regular (non-linear) jobs is given by

$$e_R(h) = \begin{cases} a_R h^{1+\theta} & \text{if } h \leq 40 \\ a_R\left(\bar{h}^{1+\theta} + \lambda_R\left(h - \bar{h}\right)\right) & \text{if } h > 40. \end{cases}$$

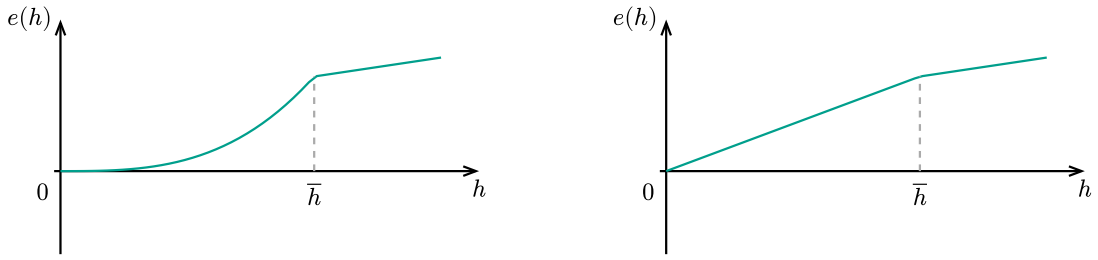
I assume that after 40 hours, the wage function becomes linear with a slope $\lambda_R$.

For non-regular jobs I have

$$e_{NR}(h) = \begin{cases} a_{NR} h & \text{if } h \leq 40 \\ a_{NR}\left(\bar{h} + \lambda_{NR}\left(h - \bar{h}\right)\right) & \text{if } h > 40. \end{cases}$$

I assume that the earnings curve of non-regular jobs is linear and has a different slope $\lambda_{NR}$ after 40 hours. The shape of $e_R(h)$ and $e_{NR}(h)$ are depicted in Figure 11 .

Since $\theta > 0$, regular workers have an incentive to work longer hours. It also means that if one of the spouses chooses a regular job and works long hours, the other wants to work short hours and select non-regular jobs.




(a) Regular Job (b) Non-Regular Job

**Figure 11: Convex Wage Schedule**.

**Joint Leisure Function** Leisure for husband and wife is produced by a CES function:

$$H = \left(v(1 - h_m - d_m)^{\xi} + (1 - v)\left(1 - h_f - d_f\right)^{\xi}\right)^{1/\xi},$$

where $v$ is a shared parameter and $\xi$ is the elasticity of the substitution of leisure hours. Leisure hours are complements if $\xi$ is less than zero, so there is an incentive to equalize their total working hours $(h_g + d_g)$. I allow asymmetric productivity in home production by $v$, which is drawn from a cumulative distribution $F_v$. It might capture one of the causes of gender gaps. The emphasis on the complementarity versus substitution between wives' and husbands' home hours follows Calvo, Lindenlaub, and Reynoso (2024), who suggest that the production function shape is critical for joint labor decisions.

**Home Hours Requirement** I assume that each household is given a home hours requirement $D$ and they choose the allocation of $d_m$ and $d_f$. $D$ is heterogeneous across households, which reflects the fact that the amount of home hours differs based on the number of children and their age. In particular, I consider that $D$ is drawn from a cumulative distribution $F_D$.

# 4 Calibration

In this section, I describe the calibration strategies. All the parameters are determined by solving the model and matching a set of data targets.

## 4.1 Estimated Parameters

It is assumed that occupational specific productivity levels $\left(a_{m,R}, a_{m,NR}, a_{f,R}, a_{f,NR}\right)$ are drawn from a multivariate log-normal distribution. I assume that there is no asymmetry between husbands and wives in the mean of the market productivity for regular and non-regular jobs. I also assume that the correlations between regular and non-regular job productivity are gender neutral, i.e.,

$$
\begin{aligned}
\mu_{a_{m,R}} &= \mu_{a_{f,R}} = \mu_{a_R}, \\
\mu_{a_{m,NR}} &= \mu_{a_{f,NR}} = \mu_{a_{NR}}, \\
\sigma^2_{a_{m,R}} &= \sigma^2_{a_{f,R}} = \sigma^2_{a_R}, \\
\sigma^2_{a_{m,NR}} &= \sigma^2_{a_{f,NR}} = \sigma^2_{a_{NR}},
\end{aligned}
$$

and

$$
\rho_{a_{m,R},a_{m,NR}} = \rho_{a_{f,R},a_{f,NR}} = \rho_{a_R,a_{NR}}.
$$

This means that gender gaps in the model are endogenously generated by household choices. Furthermore, the mean of the ability for regular work is normalized to 1, i.e., $\mu_{a_R} = 0$.

Finally, to reduce the number of parameters, I make three additional assumptions. First, the variances of productivity for regular and non-regular jobs are the same, $\sigma^2_R = \sigma^2_{NR} = \sigma^2$. Second, the correlation of productivity for regular jobs between spouses is the same as the correlation of productivity for non-regular jobs between spouses ($\rho_{a_{m,R},a_{f,R}} = \rho_{a_{m,NR},a_{f,NR}} = \rho_{mf}$). Third, the cross-occupational gender correlation holds the independence condition, i.e., $\rho_{a_{m,R},a_{f,NR}} = \rho_{a_{m,NR},a_{f,R}} = \rho_{R,NR}\rho_{mf}$.

Based on these assumptions, the productivity levels of a couple are drawn from:

$$
\begin{pmatrix} a_{m,R} \\ a_{f,R} \\ a_{m,NR} \\ a_{f,NR} \end{pmatrix} \sim \log \mathcal{N}\left( \begin{pmatrix} 0 \\ 0 \\ \mu_{NR} \\ \mu_{NR} \end{pmatrix}, \begin{pmatrix} \sigma^2 & \rho_{mf}\sigma^2 & \rho_{R,NR}\sigma^2 & \rho_{R,NR}\rho_{mf}\sigma^2 \\ \cdot & \sigma^2 & \rho_{R,NR}\rho_{mf}\sigma^2 & \rho_{R,NR}\sigma^2 \\ \cdot & \cdot & \sigma^2 & \rho_{mf}\sigma^2 \\ \cdot & \cdot & \cdot & \sigma^2 \end{pmatrix} \right)
$$

The home requirements $D = d_m + d_f$ also differ across couples according to

$$
D \sim Beta(\alpha_d, \beta_d).
$$

This heterogeneity represents differences in domestic labor hours based on the number and age of children. Note that the value $D$ is defined between 0 and 1, which can be satisfied by one person or shared by both.

Given these functional assumptions, there are 13 parameters to be calibrated:

$$
\Big\{ \underbrace{\lambda_R, \lambda_{NR}, \theta}_{\text{production function}} \underbrace{\mu_{NR}, \sigma^2, \rho_{R,NR}, \rho_{mf},}_{\text{productivity}} \underbrace{\gamma, \xi, \nu,,}_{\text{joint leisure}} \underbrace{\alpha_d, \beta_d,}_{\text{domestic labor hours}} \underbrace{\delta}_{\text{social norm}} \Big\}.
$$

## 4.2 Moments

The table Table 1 displays the selected target moments and their corresponding values computed from the data in the fourth column. Although all parameters in the model have an impact on all the targets, the table highlights the target that is most influenced by each specific parameter.

Since $\lambda_R$ and $\lambda_{NR}$ directly affect the choice of working hours, the mean of working hours is targeted. Similarly, $\theta$ and $\mu_{NR}$ relate to occupational choices, and I choose the share of each occupation as a target. The targets, the standard deviation of log wages of female regular workers, the difference in the mean of log wages between female regular and non-regular workers, and the correlation of log wages of both-regular-worker couples are respectively connected to the productivities' variance and covariance matrix parameter $\sigma$, $\rho_{R,NR}$, and $\rho_{m,f}$. The joint leisure function parameters, $\xi, \gamma, \nu$, and the domestic labor requirements $\alpha_d$ and $\beta_d$ are targeted to their leisure and domestic labor hours.

The market outcomes of males are not targeted. As a result, the gender gaps produced by the model are not targeted and come from the asymmetric components of the model, i.e., the share parameter $\nu$ and social norm $\delta$.

**Table 1:** Calibration Results of Baseline Model

| Parameter | Value | Target | Data | Model |
|---|---|---|---|---|
| $\lambda_R$ | 0.204 | Mean of $h_f$ for regular workers | 0.492 | 0.552 |
| $\lambda_{NR}$ | 0.636 | Mean of $h_f$ for non-regular workers | 0.304 | 0.223 |
| $\theta$ | 2.828 | Share of regular workers, females | 0.247 | 0.242 |
| $\mu_{NR}$ | −2.481 | Share of non-regular workers, females | 0.433 | 0.346 |
| $\sigma$ | 0.900 | Standard deviation of $\log w_{f,R}$ | 0.776 | 0.922 |
| $\rho_{R,NR}$ | 0.982 | Difference in mean of $\log w_{f,R}$ and $\log w_{f,NR}$ | 0.622 | 0.590 |
| $\rho_{m,f}$ | 0.145 | Correlation of log wages, $R$ and $R$ couples | 0.487 | 0.399 |
| $\xi$ | −2.171 | Correlation of $l_m$ and $l_f$ | 0.362 | 0.405 |
| $\gamma$ | 0.996 | Mean of $d_m$ for regular workers | 0.135 | 0.056 |
| $\nu$ | 0.634 | Mean of $d_f$ for regular workers | 0.276 | 0.279 |
| $\alpha_d$ | 0.830 | Mean of $d_m$ for non-regular workers | 0.132 | 0.099 |
| $\beta_d$ | 0.896 | Mean of $d_f$ for non-regular workers | 0.317 | 0.377 |
| $\delta$ | 1.187 | Share of $e_m < e_f$ | 0.071 | 0.073 |

Notes: The first and second columns show the estimated value of the model parameters. The third column is the calibration targets, and the fourth and fifth columns are their moment values in the data and the baseline model. The distance between these columns is minimized by the method of simulated moments.

# 5 Baseline Economy

## 5.1 Parameters

The second column in Table 1 shows the estimated parameter values. By comparing the fourth and the fifth columns, which are the moments in the data and the model, we can see that the model matches all the targets reasonably well. The share parameter of joint leisure function $\nu = 0.63$ is larger than 0.5. It implies that husbands weigh more on leisure, and they might not spend

more on domestic labor. The requirement of home hours has the mean 0.48 ($\alpha_d = 0.83$ and $\beta_d = 0.90$), which corresponds to 38.5 hours per week.

The elasticity of substitution of home production $\xi = -2.17$ suggests that the leisure hours are strategic complements. Calvo, Lindenlaub, and Reynoso (2024) also find that the rest of the working hours are strategic complements in Germany. The production function convexity of regular workers $\theta = 2.83$ captures the non-linear earnings of regular jobs. This is in line with the aforementioned literature (Goldin (2014), Erosa, Fuster, Kambourov, and Rogerson (2022)). The log-mean of productivity of non-regular jobs $\mu_{a_{NR}} = -2.48$ mostly reflects the wage gap between regular and non-regular jobs.[10] The gender correlation in skills $\rho_{a_m,a_f} = 0.15 \simeq 0$ implies assortative mating. The strong correlation between productivity of regular and non-regular jobs $\rho_{R,NR} = 0.98 \simeq 1$ suggests that the two types of skills are related at a certain level.

## 5.2 Occupational Choices and Hours Worked

**Table 2:** Occupational Choice in Baseline Model

| | Wife | | |
|---|---|---|---|
| Husband | Regular | Non-regular | Not-work |
| **Data** | | | |
| Regular | 0.30 | 0.31 | 0.28 |
| Non-regular | 0.01 | 0.06 | 0.02 |
| Not-work | 0.01 | 0.01 | 0.00 |
| **Model** | | | |
| Regular | 0.17 | 0.34 | 0.41 |
| Non-regular | 0.00 | 0.00 | 0.00 |
| Not-work | 0.07 | 0.00 | 0.00 |

Notes: The table shows the occupational choice of husbands and wives. The rows are husbands' occupations and the columns are wives' occupations. Each number is the density of each combination of couples' occupational choices.

Next, I show how the model economy performs along dimensions that are not targeted in the calibration. In Table 2 , I present the occupational choice matrix for husbands and wives. The rows are husbands' jobs and the columns are wives' jobs, and each cell represents the ratio of the combination of the couple's occupational choices to the total. Overall, the model explains the distribution of occupational well. However, more husbands do not work in the model than in the data. It suggests that the inflexibility of regular jobs (convexity of their earnings) is excessive or the social norms on gender roles are insufficient.

[10]One of the reasons why non-regular jobs pay less is that non-regular workers are less likely to have job training. According to JPSED, 40.3% (35.2%) of male (female) regular workers have additional opportunities for training given by their employers (off-the-job training), while 22.1% (21.6%) of male (female) non-regular workers have.

Finally, I compare the time allocation of couples in each occupation in Table 3 . The model captures well the characteristic patterns: First, husbands work longer than wives. Second, regular workers work longer than non-regular workers.

**Table 3:** Allocation of Weekly Working Hours of Baseline Model

| | | Data | | Model | |
|---|---|---|---|---|---|
| Husband | Wife | Husband | Wife | Husband | Wife |
| Regular | Regular | 44.7 | 39.6 | 45.2 | 41.0 |
| Regular | Non-regular | 45.7 | 23.6 | 46.8 | 17.8 |
| Non-regular | Regular | 36.8 | 40.3 | 35.0 | 40.0 |
| Non-regular | Non-regular | 39.6 | 25.5 | 31.8 | 15.5 |

Notes: The table shows the allocation of weekly working hours by couple's occupations. The first and second columns show the husband and wife's occupations. The rest of the columns show the corresponding working hours per week.

# 6 Gender Gaps

How do gender gaps in the model economy, which are not directly targeted, compare with the data? Table 4 shows the gender gaps in the aggregate economy. The first column is the statistics from the data and the second column is the simulation results. The third column shows the ratio of the model to the data column. The first row, the gender gap in participation, means the difference in participation rates across genders. The second row, the gender gap in occupation, represents the difference between the share of regular workers. For example, the value 0.69 in the data column represents the difference in the ratio of regular workers (93.5 % for males and 24.7% for females.) The third and fourth rows are the gender gaps in log working hours and wages. One of the most interesting findings is that the model explains almost all of the gender gap in the participation rate (112.0%), occupational choices (99.5%), and working hours (139.5%). This is consistent with the social norm against wives' higher earnings. Women have the incentive to reduce their earnings (to zero) by quitting their jobs, changing their occupations, or reducing their working hours. In addition, the model explains a significant proportion of gender gaps in wages (22.4%).

**Table 4:** Gender Gaps in Baseline Model

| | Data | Model | Ratio |
|---|---|---|---|
| Participation | 0.30 | 0.34 | 112% |
| Occupation | 0.69 | 0.68 | 99% |
| Labor Hours | 0.49 | 0.69 | 140% |
| Wage | 0.76 | 0.17 | 22% |

Notes: This table shows gender gap measurements and their values in data and model. The row "Participation" shows the difference in participation rate between males and females. The row of "Occupation" is the gap in the ratio of regular workers. The third and fourth rows are the gaps in log working hours and wages. The "Ratio" column shows the ratio of gaps in the model to the ones in the data.

# 7 Mechanisms

What accounts for the gender wage gap and part-time work in Japan? In the model, two factors play a key role in answering these questions: **job inflexibility** and **social norms**. As discussed in Section 2.4, Japan has relatively strong social norms on wives' earnings, and the job inflexibility of Japanese regular workers is high.

To this end, I run simulations with $\theta = 0.0$ and $\delta = 0.0$, fixing other parameters. Table 5 shows the comparison of occupational choices with the baseline model. If the wage schedule of the regular workers is linear ($\theta = 0.0$), the job inflexibility of the regular jobs gets eased. As a result, all wives work as regular workers, with none choosing non-regular jobs. This is consistent with the fact that job inflexibility is one of the main reasons for women choosing non-regular jobs (Figure 6 ). Then, as Table 6 shows, the gaps in occupational choice shrink and correspond to the gaps in participation since all husbands and wives work as regular workers. It eliminates the gender wage gap because the payment gap between regular and non-regular jobs is one of the main causes of the gender wage gap.

When social norms do not exist, $\delta = 0.0$, all the gender gaps disappear since the labor market is symmetric. The only gap comes from the husband's weight $\nu = 0.63 > 0.5$ in the joint leisure function, which disincentivizes husbands to work. Interestingly, the last panel of Table 5 shows that this change comes from both husband and wife. Without social norms, in 38.7% of couples, the husband does not work while his wife works as a regular worker. It means that the elimination of social norms encourages women to work as regular workers and also allows men to choose not to work.

**Table 5:** Comparison in Occupational Choice

| | Wife | | |
|---|---|---|---|
| Husband | Regular | Non-regular | Not-work |
| **Baseline** | | | |
| Regular | 0.17 | 0.34 | 0.41 |
| Non-regular | 0.00 | 0.00 | 0.00 |
| Not-work | 0.07 | 0.00 | 0.00 |
| $\theta = 0.0$ | | | |
| Regular | 0.73 | 0.00 | 0.20 |
| Non-regular | 0.00 | 0.00 | 0.00 |
| Not-work | 0.07 | 0.00 | 0.00 |
| $\delta = 0.0$ | | | |
| Regular | 0.15 | 0.07 | 0.31 |
| Non-regular | 0.08 | 0.00 | 0.00 |
| Not-work | 0.39 | 0.00 | 0.00 |

Notes: This table shows the fraction of each combination of couples' occupations. The first panel shows the results of the baseline model. The second and the third panel is the simulation results of setting $\theta = 0.0$ and $\delta = 0.0$, fixing other parameters.

**Table 6:** Comparison in Gender Gaps

| | Baseline | $\theta = 0$ | $\delta = 0$ | Remaining Gap $\theta$ | Remaining Gap $\delta$ |
|---|---|---|---|---|---|
| Participation | 0.34 | 0.14 | −0.07 | 40% | -21.7% |
| Occupation | 0.68 | 0.14 | −0.09 | 20% | -12.5% |
| Labor Hours | 0.69 | 0.69 | −0.13 | 100% | -19.6% |
| Wage | 0.17 | −0.10 | −0.02 | -60% | -13.9% |

Notes: This table shows gender gaps measurements for baseline, $\theta = 0.0$, and $\delta = 0.0$ cases. The fourth (fifth) column is the ratio of values of $\theta = 0.0$ ($\delta = 0.0$) to the baseline. It tells the fraction of gaps that are not explained by $\theta$ ($\delta$).

# 8 Outsourcing of Housework

Available evidence suggests that outsourcing housework could increase women's labor supply (Halldén and Stenberg 2014; Raz-Yurovich and Marx 2019), and low-skilled international migration can be a factor (Cortés and Tessada 2011; Barone and Mocetti 2011; Farré, González, and Ortega 2011). However, these external housework services are rarely used in Japan. According to the Family Income and Expenditure Survey 2021 of the Japanese Statistics Bureau, households of

two or more persons pay only 3 euros per *year*.[11] It is also true that Japan has a restrictive policy on immigration.

Suppose households could purchase household services in the market in Japan. How would this affect gender gaps? To answer this question, I extend the baseline model as follows.

$$\max_{h_m,h_f,d_m,d_f,d,j_m,j_f} U = \ln c + \gamma \ln H\Big(1 - h_m - d_m, 1 - h_f - d_f\Big) - \delta \mathbb{1}\Big\{e_m < e_f\Big\},$$

subject to

$$c + pd = e_m\big(h_m, a_{m,j}, j_m\big) + e_f\Big(h_f, a_{f,j}, j_f\Big),$$

and

$$D = d_m + d_f + d.$$

where $d$ is purchasable housework hours, and $p$ is its price. This model allows couples to buy outside household labor services and to satisfy the home hours constraints. In other words, it encourages high-skilled men and women to work more in the labor force.

Given the scarcity of housework services, we can consider that the price of external housework, $p$, in the benchmark economy is too expensive in Japan so $d = 0$. Then, I conduct a simulation of the case where the price of housework services is affordable. In particular, I set its price as the median wage of a non-regular job in the benchmark economy ($p = \exp(\mu_{NR})$). I here assume that the housework services are a non-regular job. The rest of the parameters are fixed at the calibration of the baseline model.

Table 7 compares the choice of working hours and home hours. The existence of external housework services largely eliminates the need for *rich* couples to work for domestic labor. Since the price of housework services is the median wage of non-regular jobs, the couples with regular jobs can afford to outsource their housework. On the other hand, for the couples with non-regular jobs, the price of housework services is almost the same as their opportunity cost (wage). Therefore, they do not outsource their housework.

[11] I use the category "540 Housekeeping services".

**Table 7:** Working and Home Hours with Outsourcing $d$

| | | Baseline | | Outsourcing | |
|---|---|---|---|---|---|
| Husband | Wife | Husband | Wife | Husband | Wife |
| **Working Hours** | | | | | |
| Regular | Regular | 45.2 | 41.0 | 50.0 | 47.2 |
| Regular | Non-regular | 46.8 | 17.8 | 49.3 | 23.5 |
| Non-regular | Regular | 35.0 | 40.0 | 35.0 | 40.0 |
| Non-regular | Non-regular | 31.8 | 15.5 | 31.0 | 15.7 |
| **Domestic Labor** | | | | | |
| Regular | Regular | 2.8 | 9.4 | 0.1 | 1.0 |
| Regular | Non-regular | 5.4 | 30.1 | 2.5 | 19.0 |
| Non-regular | Regular | 11.1 | 11.5 | 11.1 | 11.5 |
| Non-regular | Non-regular | 22.9 | 43.2 | 23.6 | 42.9 |

Table 8 shows the remaining gender gaps under external housework services. It eliminates significant proportions of all types of the gender gaps (77% in participation, 52% in occupation, 59% in working hours, 61% in wages). This is a consistent result of the fact that housework is one of the main reasons for women choosing non-regular jobs in Figure 6 . The housework services allows women to work longer hours and to choose regular jobs.

**Table 8:** Gender Gaps with Outsourcing $d$

| | Baseline | Outsourcing | Remaining Gender Gaps |
|---|---|---|---|
| Participation | 0.34 | 0.08 | 23.4% |
| Occupation | 0.68 | 0.33 | 48.3% |
| Labor Hours | 0.69 | 0.28 | 41.2% |
| Wage | 0.17 | 0.07 | 39.2% |

# 9 Conclusion

In this paper, I build a model that can account for the gender gaps in participation rates, occupational choices, working hours, and wages in Japan. The key ingredients of the model are the inflexibility of working hours and social norms. The baseline model is simple and explains almost all of the gender gaps in participation rates, occupational choices, labor hours, and 22.4% in wages. In addition, the distribution of occupational choices is well-replicated.

I also disentangle the mechanism of why the gender gap is high in Japan. The simulation results show that the job inflexibility of regular jobs discourages women from having regular jobs, which provide higher wages. The social norms on wives' earnings reduce women's labor force participation and their working hours (extensive and intensive margin). In addition, cheap external housework services can relax the time constraints of couples and significantly reduce all the types of gender gaps.

There are some possible extensions for future work. For example, Doepke and Kindermann (2019) considers that males and females are bargaining for fertility and household hours. We can consider an economy where husbands and wives are bargaining instead of maximizing their joint utilities. In addition, we can expand a model to a lifecycle setting. Xiao (2020) builds a model that captures human capital accumulation, preference for job amenities, and employers' statistical discrimination in wage offers and hiring. Lifecycle modeling enables us to clarify the relationship between the gender gaps and the difference in life events between men and women.

# Appendix

## A Data Description

The analysis is mostly based on the Japan Panel Study of Employment Dynamics (JPSED) and Survey on Dual-Income Couples' Household Economy and Attitudes (SDICHEA), 2014.[12]

JPSED is panel data since 2016, with the most recent wave from 2020. The sample of JPSED2016 is 49,131 men and women older than 15 in Japan. The sample has increased to 57,284 in JPSED2020 with some attrition and addition. This survey has information on earnings, working hours, types of jobs, spouse's job, and spouse's earnings. To calculate the targets for the calibration, I use the pooled data from JPSED2016 to JPSED2020 and restrict the sample to individuals aged between 25 and 59, married, and employed (not self-employed or executive officer.)

The sample of SDICHEA is 2,200 dual-earner couples in the Greater Tokyo Area, aged from 35 to 49 for females and from 35 to 55 for males. To adjust the age range to 25-59, I used the sample of which spouse is aged between 25 and 59. This is a one-year survey in 2014 and has information on earnings, working hours, and types of jobs. Since the sample consists of couples where both of them work, they may differ from the whole sample of JPSED, which is a random sample of the whole Japanese population of working ages. However, this is not a major issue because I used SDICHEA only for the gender correlation of working hours and log wages for dual-earner couples.

Table A.1 and Table A.2 show the sample statistics for JPSED and SDICHEA. While most of the values are similar in these two data sets, one difference is in the ratio of non-regular to regular workers in the female. In SDICHEA, 35.1% of females are regular workers and 61.4% are non-regular workers, while in JPSED, the percentages are 37.7% and 42%. The difference might suggest that the gender correlations between working hours and wages are potentially biased.

[12] "Japanese Panel Study of Employment Dynamics, Recruit Works Institute" and "Survey on Dual-Income Couples' Household Economy and Attitudes, 2014, The Institute for Research on Household Economics" was provided by the Social Science Japan Data Archive, Center for Social Research and Data Archives, Institute of Social Science, The University of Tokyo. The description of the data can be found at https://ssjda.iss.u-tokyo.ac.jp/Direct/gaiyo.php?eid=1349 (JPSED) and https://ssjda.iss.u-tokyo.ac.jp/Direct/gaiyo.php?eid=1139 (SDICHEA).

**Table A.1:** Data Summary of JPSED

| | | Men (N=81550) | | Women (N=73694) | |
|---|---|---|---|---|---|
| | | Mean | Std. Dev. | Mean | Std. Dev. |
| Age | | 40.9 | 9.4 | 42.2 | 9.8 |
| Working Hours | | 43.8 | 12.1 | 33.7 | 12.7 |
| Hourly Wage (JPY) | | 2573.1 | 4628.7 | 1593.8 | 3286.9 |
| | | N | Pct. | N | Pct. |
| Occupation | Regular | 69902 | 85.7 | 27770 | 37.7 |
| | Non-regular | 10812 | 13.3 | 30972 | 42.0 |
| | Not-work | 836 | 1.0 | 14952 | 20.3 |

Notes: Pooled Data from JPSED2016-2020.

**Table A.2:** Data Summary of SDICHEA

| | | Men (N=2277) | | Women (N=2277) | |
|---|---|---|---|---|---|
| | | Mean | Std. Dev. | Mean | Std. Dev. |
| Age | | 43.5 | 5.3 | 41.6 | 3.9 |
| Working Hours | | 48.0 | 15.2 | 28.0 | 14.2 |
| Hourly Wage (JPY) | | 3250.3 | 3684.8 | 1755.9 | 4192.3 |
| | | N | Pct. | N | Pct. |
| Occupation | Regular | 2062 | 90.6 | 799 | 35.1 |
| | Non-regular | 202 | 8.9 | 1399 | 61.4 |
| | Not-work | 13 | 0.6 | 79 | 3.5 |

Notes: Data from SDICHEA, 2014.

# B Robustness Check

## B.1 Specifications of Discontinuity of Relative Earnings

Figure 7 indicates the gap in the density of share of earnings between husbands and wives. While this graph simply shows the discontinuous behavior of couples in terms of earnings, the 5% binning may be too coarse. I thus conduct the same analysis with 1% binning. In Figure A.1 , we can see discontinuity at 50% of the share of earnings in both specifications. We can also see the mass point at 50% in the 1% binning specification, and the density at exactly 50% is 0.077. The existence of the mass point at 50% is also consistent with the model settings. The utility cost is imposed when a wife earns strictly more than her husband, and they have an incentive to earn the same amount. You can also see Kuehnle, Oberfichtner, and Ostermann (2021) for a more detailed discussion about the mass point at 50% of the share of earnings and the specification of the discontinuity.

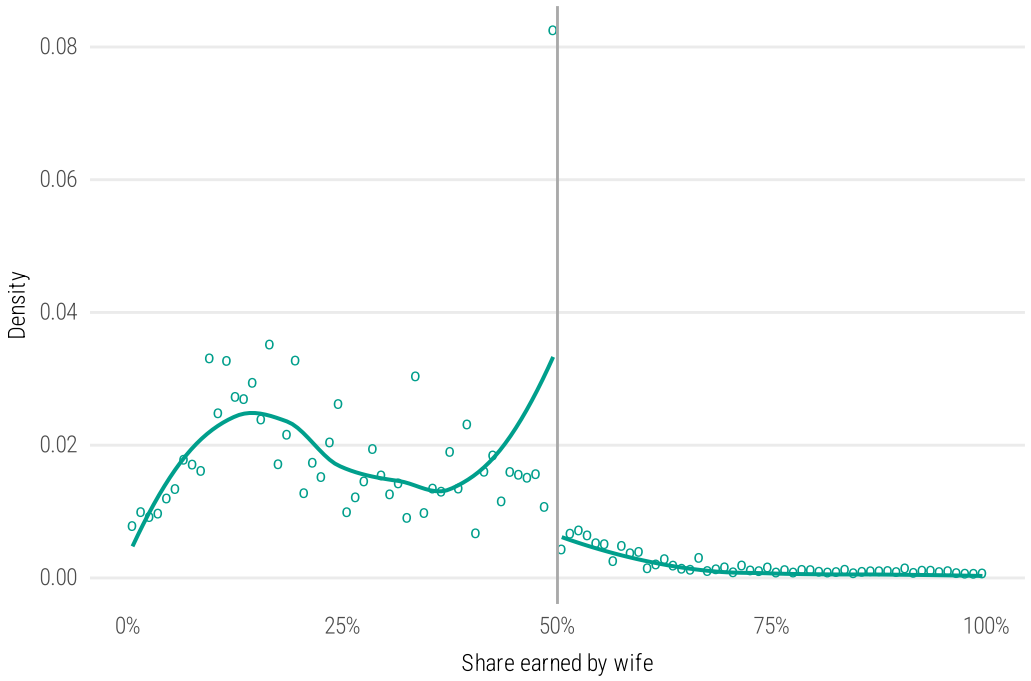



**Figure A.1: Distribution of Relative Earnings**. The samples are the same as Figure 7 . The figure shows the density of the share of earnings between husbands and wives with 1% binning.

## References


Aaronson, Daniel, and Eric French. 2004. "The Effect of Part-Time Work on Wages: Evidence from the Social Security Rules". *Journal of Labor Economics* 22 (2): 329–252. https://doi.org/10.1086/381252

Albanesi, Stefania, Claudia Olivetti, and Barbara Petrongolo. 2023. "Families, Labor Markets, And Policy". *Handbook of the Economics of the Family*. Elsevier. https://doi.org/10.1016/bs.hefam.2023.01.004

Ameriks, John, Joseph Briggs, Andrew Caplin, Minjoon Lee, Matthew D. Shapiro, and Christopher Tonetti. 2020. "Older Americans Would Work Longer If Jobs Were Flexible". *American Economic Journal: Macroeconomics* 12 (1): 174–209. https://doi.org/10.1257/mac.20170403

Asao, Yutaka. 2011. "Overview of Non-Regular Employment in Japan". *Non-Regular Employment–Issues and Challenges Common to the Major Developed Countries*, 1–42

Barone, Guglielmo, and Sauro Mocetti. 2011. "With a Little Help from Abroad: The Effect of Low-Skilled Immigration on the Female Labour Supply". *Labour Economics* 18 (5): 664–75. https://doi.org/10.1016/j.labeco.2011.01.010

Berniell, Inés, Lucila Berniell, Dolores de la Mata, María Edo, Yarine Fawaz, Matilde P. Machado, and Mariana Marchionni. 2022. "Motherhood, Pregnancy or Marriage Effects?". *Economics Letters* 214 (May): 110462–63. https://doi.org/10.1016/j.econlet.2022.110462

Bertrand, Marianne, Emir Kamenica, and Jessica Pan. 2015. "Gender Identity and Relative Income within Households *". *The Quarterly Journal of Economics* 130 (2): 571–614. https://doi.org/10.1093/qje/qjv001

Bick, Alexander, Adam Blandin, and Richard Rogerson. 2022. "Hours and Wages*". *The Quarterly Journal of Economics*, January, qjac5. https://doi.org/10.1093/qje/qjac005

Calvo, Paula, Ilse Lindenlaub, and Ana Reynoso. 2024. "Marriage Market and Labor Market Sorting". *Review of Economic Studies*, January, rdae10. https://doi.org/10.1093/restud/rdae010

Cortés, Patricia, and José Tessada. 2011. "Low-Skilled Immigration and the Labor Supply of Highly Skilled Women". *American Economic Journal: Applied Economics* 3 (3): 88–123

Cubas, German, Chinhui Juhn, and Pedro Silos. 2019. "Coordinated Work Schedules and the Gender Wage Gap", December, w26548. https://doi.org/10.3386/w26548

Doepke, Matthias, and Fabian Kindermann. 2019. "Bargaining over Babies: Theory, Evidence, And Policy Implications". *American Economic Review* 109 (9): 3264–3306. https://doi.org/10.1257/aer.20160328

Erosa, Andrés, Luisa Fuster, Gueorgui Kambourov, and Richard Rogerson. 2022. "Hours, Occupations, And Gender Differences in Labor Market Outcomes". *American Economic Journal: Macroeconomics* 14 (3): 543–90. https://doi.org/10.1257/mac.20200318

Farré, Lidia, Libertad González, and Francesc Ortega. 2011. "Immigration, Family Responsibilities and the Labor Supply of Skilled Native Women", The B.E. Journal of Economic Analysis & Policy, 11 (1). https://doi.org/10.2202/1935-1682.2875

Forum, World Economic. 2023. "Global Gender Gap Report 2023"

Goldin, Claudia. 2014. "A Grand Gender Convergence: Its Last Chapter". *American Economic Review* 104 (4): 1091–1119. https://doi.org/10.1257/aer.104.4.1091

Goldin, Claudia, and Lawrence F. Katz. 2011. "The Cost of Workplace Flexibility for High-Powered Professionals". *The ANNALS of the American Academy of Political and Social Science* 638 (1): 45–67. https://doi.org/10.1177/0002716211414398

Halldén, Karin, and Anders Stenberg. 2014. "The Relationship between Hours of Domestic Services and Female Earnings: Panel Register Data Evidence from a Reform". *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.2534703

Herold, Elena, and Luisa Wallossek. 2023. "The Marriage Earnings Gap"

Kitao, Sagiri, and Minamo Mikoshiba. 2022. "Why Women Work the Way They Do in Japan: Roles of Fiscal Policies". *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.4054049

Kleven, Henrik, Camille Landais, and Gabriel Leite-Mariante. 2024. "The Child Penalty Atlas". *The Review of Economic Studies*, October, rdae104. https://doi.org/10.1093/restud/rdae104

Kleven, Henrik, Camille Landais, and Jakob Egholt Søgaard. 2019. "Children and Gender Inequality: Evidence from Denmark". *American Economic Journal: Applied Economics* 11 (4): 181–209. https://doi.org/10.1257/app.20180010

Kuehnle, Daniel, Michael Oberfichtner, and Kerstin Ostermann. 2021. "Revisiting Gender Identity and Relative Income within Households: A Cautionary Tale on the Potential Pitfalls of Density Estimators". *Journal of Applied Econometrics* 36 (7): 1065–73. https://doi.org/10.1002/jae.2853

Onozuka, Yuki. 2016. "The Gender Wage Gap and Sample Selection in Japan". *Journal of the Japanese and International Economies* 39 (March): 53–72. https://doi.org/10.1016/j.jjie.2016.01.002

Raz-Yurovich, Liat, and Ive Marx. 2019. "Outsourcing Housework and Highly Skilled Women's Labour Force Participation—An Analysis of a Policy Intervention". *European Sociological Review* 35 (2): 205–24. https://doi.org/10.1093/esr/jcz001

Teruyama, Hiroshi, Yasuo Goto, and Sebastien Lechevalier. 2018. "Firm-Level Labor Demand for and Macroeconomic Increases in Non-Regular Workers in Japan". *Japan and the World Economy* 48 (December): 90–105. https://doi.org/10.1016/j.japwor.2018.08.006

Xiao, Pengpeng. 2020. "Wage and Employment Discrimination by Gender in Labor Market Equilibrium". *VATT Working Papers* 144 (February)